# systemd -
# A very short introduction

# Prof. Rossano Pablo Pinto

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# Agenda

# Introduction

- systemd replaces SysV init
  - event based
  - **runlevel** concept is replaced by **target**
  - each target **wants** something
  - **Ok, so first things first**.... Let me introduce the concept of unit (the slide after the next)

# Basic usage of systemctl

- systemctl start|stop|status... UNIT. Ex.:

  - `systemctl start httpd`

- systemctl enable|disable UNIT. Ex.:

  - `systemctl enable httpd`

- systemctl mask|unmask UNIT (avoid starting a "service"(unit) by accident). Ex.:

  - `systemctl mask iptables`

# Systemd UNIT
## (`man systemd` – read the CONCEPTS section)

- systemd manages units

- Each unit has a type.
  There are 11 types:

```
1.service
2.socket
3.target
4.device
5.mount
```

```
6.automount
7.timer
8.swap
9.path
10.slice
11.scope
```

check the manual pages:

`man systemd.<TYPE>`

# Systemd UNIT files

- Distribution:

  - `/usr/lib/systemd/system`

- Administrator:

  - `/etc/systemd/system`

- Drop-ins:

  - `/etc/systemd/system/[name.type].d/*.conf`

- Runtime:

  - `/run/systemd/` (automatically generated)

# Systemd ...target.wants directory

- Distribution:
  - /lib/systemd/system/XXX.target.wants
    - links to all units that must be activated for this TARGET
- Administrator:
  - /etc/systemd/system/XXX.target.wants
    - links to all units that must be activated for this TARGET
- SOME SYSV SIMILARITY?? (rcX.d ??)

# Systemd UNIT

- `service`

  - "Service units, which start and control daemons and the processes they consist of..."

  - `man systemd.service`

# Systemd UNIT

- `socket`

  - "Socket units, which encapsulate local IPC or network sockets in the system, useful for socket-based activation..."

  - `man 5 systemd.socket`

  - `man 7 daemon`

# Systemd UNIT

- `target`

  - It's a way of grouping other units - It's a concept that resembles that of **runlevel** (but IT'S not a runlevel).

  - "Target units are useful to group units, or provide well-known synchronization points during boot-up..."

  - `man 5 systemd.target`

# Systemd UNIT

- `device`

  - "Device units expose kernel devices in systemd and may be used to implement device-based activation..."

  - `man 5 systemd.device`

# Systemd UNIT

- `mount`

  - "replaces" `/etc/fstab` (can be used, and is still used, along `/etc/fstab`)

  - USE FSTAB !!!!

  - Example: `/dev/sdb1` , `/mnt/hd`. Create a file `/etc/systemd/system/`**`mnt-hd`**`.mount` (Observe the file name!!!!):

NEXT SLIDE

# Systemd UNIT

```
[Unit]

Description=sdb1 mount


[Mount]

What=/dev/sdb1

Where=/mnt/hd

Type=ext4

Options=defaults


[Install]

WantedBy=multi-user.target
```

# Systemd UNIT

systemctl start mnt-hd.mount

systemctl enable mnt-hd.mount

# Network Configuration

- Common programs to manage network
  - NetworkManager
    - `nmcli` is the command to interact with NetworkManager
  - `systemd-networkd`

# Network Configuration

- Enable network management by systemd-networkd

  - `systemctl start systemd-networkd`

  - `systemctl enable systemd-networkd`

# Network Configuration - DHCP

- vim /etc/systemd/network/mynic.network

  [Match]

  Name=eth0

  [Network]

  DHCP=ipv4

- systemctl start systemd-networkd

- systemctl enable systemd-networkd

# Network Configuration – Fixed Address + 2 interfaces

- `vim /etc/systemd/network/eth0.network`

```
[Match]

Name=eth0

[Network]

Address=10.10.1.100/24

Gateway=10.10.1.1
```

- `vim /etc/systemd/network/eth1.network`

```
[Match]

Name=eth1

[Network]

Address=10.10.2.100/24

Gateway=10.10.2.1
```

# Compatibility commands

- `tail -f`

  - `journalctl -f`

- `dmesg`

  - `journalctl -k`

# Useful commands

- systemctl get-default

- systemctl set-default [TARGET]

- systemctl list-dependencies [unit]
    - lists the order that units were loaded
    - Ex.: systemctl list-dependencies sshd

- systemctl list-units
    - systemctl list-units --type=target --all

# Useful commands

- `systemd-analyze critical-chain`

  – shows the time spent in each unit during loading

- `systemd-analyze plot > image.svg`

- `systemd-analyze dot`

- `systemd-analyze blame`

  – ...”prints a list of all running units, ordered by time they took to initialize.” (`man systemd-analize`)

# Automatic "things"

- "Systemd contains native implementations of various tasks that need to be executed as part of the boot process. For exemple, it sets the hostname or configures the loopback network device. It also sets up and mounts various API file systems, such as **/proc**. " - `man systemd`